Lino Camprubí. *Engineers and the Making of the Franco Regime*. Cambridge, Massachusetts; London, England: The MIT Press, 2014. Pp. 298. 40$ (e-book, 28$)

The study of scientific and technological activity under the Dictatorship of General Franco (1939-1975) continues to pose a challenge in Spanish historiography. It should be remembered that democracy was possible only after the death of Franco, his followers being unable to continue the regime. The first free elections took place in 1977, and an agreement *to forget* the past seemed to be established among the political factions.

This relative silence surrounding the Dictatorship gave rise to the idea that it was a period of complete inactivity, or of backwardness, mainly where science and technology were concerned. In fact, there is a general idea both inside and outside Spain that the contribution of Spaniards to science and technology has been almost non-existent. It is true that the Franco regime was totalitarian, based on political and social oppression and a means of developing capitalism (without democracy) in Spain. In many respects, opportunism and corruption were dominant. Nevertheless, people were obliged to continue their lives, and creativity and initiative in many fields did not disappear. After the Civil war (1936-1939), a dramatic loss of human capital occurred when many teachers, professors, scientists and intellectuals went into exile, as well as many workers and in general the most active sector of the population. This created a real crisis in Spain.

The book is divided into seven chapters: a general introduction, five case studies, and a conclusion. In the introduction, Camprubí presents the main conceptions of his book. First, the idea that technology was for the Regime a kind of "redemption", given that the Fascist movement was justified as the way to save Spain from Communism. After the war, the country would be reconstructed by means of technology. The second general consideration is an analysis of the period referred to as "autarkic",[1] the two decades after the Civil War, when the Franco regime was explicitly Fascist. During the autarkic period, engineering played a relevant role in the effort to promote the self-sufficiency of the Spanish economy,. Camprubí explains that the policies of the regime combined oppression against its opponents with the task of rebuilding the country. The author seeks to show that science and technology formed part of the development of the Franco Regime. Camprubí discusses the authors who consider that the regime was essentially against science and technology, and also discusses those who suggest that science and technology developed under Franco thanks to the efforts of professionals

[1] Camprubí prefers the word autarky (a self-sufficient system) to autarchy, which could mean autocracy.

who were working in an environment that was hostile to them. For these purposes, Camprubí has selected what he calls five “microhistories”.

Chapter 2 deals with the first of these microhistories, which concerns the coal silo built in 1953 to preside over the new building of the Technical Institute for Construction and Cement in Madrid. The silo took a dodecahedron form that became the symbol of the new discipline of structural engineering promoted in Spain by Eduardo Torroja Miret (1899-1961). Torroja, who belonged to a distinguish family of scientists, promoted the new building technologies based on pre-stressed cement. In post-war Spain, many infrastructures had been destroyed and needed to be rebuilt, and a plan of reconstruction for the country was proposed. The new dams and bridges and the new industrial quarters in the cities represented the policies of “redemption” of Spain through a process of modernization. This may be surprising for some people, given that the Franco regime had the reputation of being reactionary and backward.

Chapter 3 deals with “laboratories and churches”. Continuing with the group of Catholic architects, Camprubí describes several projects in which laboratories and research institutes grew up alongside churches. He gives a detailed analysis of the new facilities of the Consejo Superior de Investigaciones Científicas (CSIC), built in Madrid in Serrano Street. The complex of new buildings, including a large church, was situated on the site chosen by the Junta para Ampliación de Estudios, the institution created in 1907 and later absorbed by the CSIC, removing what was regarded as contrary to the Catholic religion and the regime. There is also a study on the role played by the Jesuits, who had created a school of engineering in Madrid in 1910, the Instituto Católico de Artes e Industrias, which had been suppressed during the Second Spanish Republic (1931-1939) after the dissolution of the Society of Jesus in Spain. Graduates from this centre, together with the leading Jesuits, promoted a Catholic engineering in industry. In addition, some Catholic agronomy engineers developed the National Institute for Colonization, set up to oversee the reform of agriculture. The institute aimed to bring about a great transformation of agriculture through irrigation and new workers’ colonies, always controlled with the support of the Church. Camprubí analyses the development of these measures in which tradition, National Catholicism and technology were fully involved.

Chapter 4 deals with the extension of rice production, directed by a new laboratory where genetics was applied to finding new and more productive varieties. In Sueca, Valencia, a research institute for rice was set up in 1913, although it did not begin receiving the resources it required until 1922. The centre had an international projection, mainly in Italy, at that time

perhaps the most advanced European country in this field. By crossing different varieties of rice according to Mendelian genetics, several new varieties were obtained at the centre.

After the Civil War, the centre became part of the National Institute for Agricultural Research. The valley of the Guadalquivir, near Seville, was developed as a new zone of rice production, and in a few years became one of the most important in Spain. This development had a very great impact in the landscape.

Chapter 5 deals with the project to exploit the river Noguera Ribagorzana, in the Pyrenees, for the production of electricity. The state company ENHER was set up in 1946. This formed part of the policy of the regime to increase electricity production. The National Institute of Industry (Instituto Nacional de Industria, INI) was in charge of the industrialization of the country and took electrification as a priority. Surveys of the Noguera Ribagorzana basin had identified the possibility of building a chain of dams and power stations. The project transformed the territory with new roads, colonies for the workers and churches (one designed by Eduardo Torroja), which brought about a radical transformation of the basin. Nevertheless, the project could only be partially completed because priority was given to agricultural interests in the Ebro basin for the creation of new irrigation zones. In 1962, the ENHER power stations produced more than 1.000 kwh. Camprubí analyses the controversies between the two sectors, both in terms of engineering and the economic conceptions inside the regime itself.

Finally, Chapter 6 deals with the proposal of establishing standards for the use of cement building. The standard drawn up by the Technical Institute for Construction and Cement was largely ignored by private industry. The Institute wanted to rationalize the uses of concrete as well as introducing a state regulation, but encountered very strong opposition from the producers of cement.

This book by Lino Camprubí is a very interesting example of the work by the young generation of the historiography of science and technology in Spain. Camprubí is pursuing an international career, building on the fact that he has studied at the University of Seville and at Cornell University in the United States. It was while he was at Cornell that he was asked to study science and technology during the Franco period. Afterwards, he went to UCLA and then he moved to the Centre d'Història de la Ciència, in Barcelona. At present, he is in Berlin.

In this book, through the five studies, Camprubí seeks to provide an in-depth analysis of technology under the Franco regime. He is critical of some assumptions, such as the denial that a proper policy of technology existed in the Franco, or the idea that technology developed in

spite of the regime. To this end, Camprubí has chosen original subjects that have so far received little consideration; for example, civil engineering and the contribution of Eduardo Torroja have attracted some attention, but in general without signalling his role in Francoist policies.

The author does not pretend to offer a complete view of technology under Franco. After his discussion, he clearly states that, in alliance with certain sectors of the Church and the ruling classes, the Franco regime promoted modern technology in order to develop the economy of the country. Autarky –the period covered by Camprubí- did not mean backwardness; rather its aim was to integrate modern technology in order to build an economy in which the workers' movement was subordinate to the dictates of the upper classes and the ruling regime. The result was that, while a process of reconstruction indeed took place in the period 1939-1959, Camprubí shows very well that the policies of the autarky governments were not entirely successful. They needed 20 years to recover the levels of the 1930s, and the human cost was very high. Camprubí mentions the persecution carried out against liberal and left-wing leaders, who were obliged to go to exile and among whom were several scientists and engineers. Nevertheless, Camprubí seems not to take into account another human cost: several million people from Andalusia, Extremadura, Murcia, and Galicia were obliged to leave their native regions to go to Madrid and Catalonia, and also to emigrate altogether to Germany and France. This was probably one side-result of the modernisation of agriculture.

Camprubí leaves many subjects open for analysis. He mentions subjects of future study such as military engineering, private laboratories, and technology in the Spanish colonies in Africa. It would very interesting if he chose other fields of engineering. The cases he selects in his book were deeply committed to Francoism. I wonder what his conclusions would be if he dealt, for example, with the world of production, i.e. industry. Although some state companies were created at that time, the majority of industry was private. Would it be possible to identify a Francoist engineering in this field?

To conclude, I have to stress the interest and the relative novelty of Camprubí's study, but wish that he was able to go further in his research.